UNIVERSITY OF MINNESOTA | EXTENSION

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www.4-H.umn.edu/events/science-of-ag-response

Science of Agriculture Response:

Integrating Science and Engineering Concepts into 4-H Youth Development

Abstract

Science achievement in the United States among K-12 youth has lagged behind many of their grade level peers from other countries for many years, prompting much concern from researchers as well as from federal agencies such as the National Academy of Sciences (2007). Non-formal educational experiences, such as those found in 4-H, play an important role in increasing children's exposure to, and interest in, science. Exposure to 4-H science-related programming in particular appears to be significantly associated with higher-level science coursework taken in high school (Heck, Carlos, Barnett & Smith, 2012).

Research on science programs in non-formal settings has suggested that non-formal science programs have the potential to increase science interest among young people and that these programs can have long-lasting impacts (Heck, Carlos, Barnett & Smith, 2012).

The *Science of Agriculture Response* program will utilize an experiential learning approach that employs the skills gained from a 4-H project and requires youth to demonstrate the acquisition of those concepts in a visual presentation.

Science of Agriculture Educational Model

Science of Agriculture Response (*SOAR*) Outcomes

- 4-H members will increase their understanding and knowledge of food production and its importance in our economy and world.
- 4-H members will gain 21st Century skills, including technology, health, business and economic literacy, critical thinking, problem solving, initiative and self-direction.
- 4-H members will be exposed to and explore future careers in agriculture.

- Need for Project
- Staff Responsibilities
- Finances
- Community and Business Partners
- Timeline
- Target Audience
- Intended Outcomes

1. Identification
2. Development & Instruction
3. Facilitation & Results
4. Evaluation & Modification

- Develop Quick Start Curriculum Guide
- Conduct Workshops/Webinar
- Identify Community Resources
- Identify and train Coaches and Mentors
- Identify 4-H Member Teams

- 4-H members model the steps in the engineering process
- 4-H members explore agricultural related careers
- 4-H members experience hands-on agriculture
- A partnership between 4-H and Ag. Business and Industry develops

- To what extent did members knowledge and skills increase?
- Are members more interested in agriculture careers?
- Were connections made between 4-H and local agriculture?
- Are members better prepared for college/career?

Key Assumptions

- The community and business partners need to be evaluated yearly.
- The target audience and demographics will evolve over time.
- Outcomes will change with evaluation
- 4-H member knowledge and understanding will constantly evolve

OUTCOMES & OBJECTIVES

Through "hands on" 4-H agriculture, science, technology, engineering and math learning experiences in the SOAR Challenge, 4-H youth will:

STEM	• Get excited about agriculture and Science, Technology, Engineering, and Math.
21st Century Skills	• Gain 21st Century skills, including technology, health, business and economic literacy, critical thinking, problem solving, initiative and self-direction.
Agricultural Literacy	• Increase understanding and knowledge of food production and its importance
Career Exploration	• Be exposed to and explore future careers in agriculture.

Volunteer Roles

Coach

The role as a Coach is to inspire the team and help them get excited about the science of agriculture. Coaches give teams guidance and provide structure, encouragement, and most of all, a fun experience.

Coordinator

The Coordinator serves as the liaison between team members, Coaches, Mentors, Parents, Volunteers, and 4-H program staff. They work with the Coach to plan and schedule meetings, visits, and trips.

Mentor

A mentor is any person who works with the team in his or her area of expertise. Mentors help expose the team members to potential career.

Parents and Guardians

Parents and guardians may assist the team by serving as a Coach, Coordinator, or Mentor if they have the skills, time and interest. They may plan fundraisers, provide a team meeting space, make travel arrangements or provide refreshments.

The product being developed.

- Youth will construct and deliver a 20 minutes presentation where all members of team actively participate.
- There will be 10 minutes for interaction and questions with the judge(s) following the presentation.
- Teams must utilize the steps in the engineering design process to address the local agricultural issue that they identify.

The destination event.

- The two-day event will include judging presentations and skill-based sessions for participants and an awards celebration.
- Activities and campus tours for participants to connect them to agriculture and science resources at the University, and expose them to possible areas of future study at the University of Minnesota.

Heck, K., Carlos, R., Barnett, C., & Smith, M. (2012). 4-h participation and science interest in youth. *Journal of Extension*, *50*(2), 1-14. Retrieved from http://www.joe.org/joe/2012april/a5p.shtml

National Academy of Sciences. (2007). *Rising above the gathering storm: Energizing and employing America for a brighter economic future*. Washington, D.C.: The National Academies Press.